

ACOUSTIC MUSICAL INSTRUMENT OF THE VIOLIN FAMILY
WITH PIEZO-ELECTRIC PICKUP

BACKGROUND OF THE INVENTION

Acoustic musical instruments of the violin family, i.e., the
5 violin, viola, cello, and double bass, generate a relatively small
amount of acoustic power, and electronic amplification is often
desirable. This invention is intended to facilitate such
amplification.

Among the objects of the present invention are to provide an
10 electric pickup for an acoustic instrument of the violin family
that:

1. produces the full range of sound, both bowed and plucked;
2. has a high output level before amplification;
3. is relatively immune to acoustic feedback
- 15 4. is convenient to install;
5. does not require modification of the original instrument;
6. does not impair the acoustic properties of the original
instrument; and
7. is economical to produce.

20 Other objects and advantages of the invention will become
apparent to those skilled in the art from a reading of the
following specification.

SUMMARY OF THE INVENTION

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This invention involves a stringed musical instrument wherein one or more piezo-electric crystal sensing elements are placed under one of the feet of the bridge. In particular the invention is applicable to acoustic instruments of the violin family, e.g., violin, viola, cello, and double bass, which instruments include (within the body) a sound post located under one foot of the bridge and a relatively stiff bass bar under the other foot. The sound post couples the string induced vibrations of the bridge to the back of the instrument, while the bass bar runs longitudinally through the instrument and stabilizes the top under the bass string side of the bridge. Even though the bass bar is relatively stiff, vibrations are nevertheless induced in the top by forces coupled from the strings to the top through the bass string side foot.

The sensing element(s) of the present invention are placed between the bridge and the instrument top, preferably under the foot of the bridge which is supported by the bass bar. The pickup forms a part of the coupling of vibrations from the strings to the top of the instrument; hence the forces which cause the top to vibrate are transmitted through and are developed across the pickup. This leads to a very clear and natural sound. It has been found that a bass side location of the pickup results in an electronically amplified sound which more closely replicates the acoustic sound of the instrument than does a location under the treble side of the bridge.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of the body of a musical instrument which includes the present invention.

Figure 2 is a fragmentary cross sectional view of the musical instrument of Figure 1, taken at 2-2 of Figure 1.

Figure 3 is a plan view of one embodiment of a pickup according to the present invention; said embodiment including two sensing elements.

Figure 4 is a cross sectional view of the pickup of Figure 3 taken at 4-4 of Figures 1 and 3. The pickup is shown exploded in the vertical direction for clarity. Portions of the instrument top and the bridge are also shown.

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DETAILED DESCRIPTION OF THE INVENTION

A portion of a musical instrument of the violin family is shown in Figure 1, which instrument incorporates the present invention and includes a top 11, a bass bar 12, a sound post 13, a bridge 14, and strings 15 having different resonant frequencies. The strings having the lowest resonant frequencies are called the bass strings. A piezo-electric pickup 16 is located between the foot 17 of bridge 14 and top 11. The pickup 16 is preferably located under the foot of the bridge which is supported by the bass bar, i.e., under the side of the bridge nearest the bass strings. Tension in the strings forces the bridge against the instrument top, resulting in good contact between the pickup and the bridge. Hence, vibrations of the strings are coupled directly to the pickup, and high output is obtained. Since the bass bar is relatively stiff, it, as well as the top, form a base against which the force which drives the pickup is developed.

The pickup 16 may include one or more sensing elements 18; the pickup shown in Figure 3 including two. Generally, the smaller instruments, such as the violin and viola will use one sensor, while the larger cello and double bass may use two.

As can be seen in Figure 4, the pickup is a sandwich of several elements. The bottom layer, which rests against the instrument top, is a piece of conductive foil 19 which acts as an electrical shield. It is connected to the shield/ground of the shielded output lead 20. An insulating pad 21 insulates foil 19

Since piezo-electric sensing elements can be made quite small
(3/16 in. diameter X 1/32 in thick being readily available) a
pickup as described above can easily be installed on an existing
violin, or other instrument of the violin family, without
5 modification of the instrument. Also since the sensing element(s)
can be small as indicated in the previous sentence, a pickup can
be made according to the construction described which is flexible
and can be made to conform to the curved shape of the top of the
instrument. It has been found that installation of such a pickup
10 does not impair the acoustic properties of the instrument.

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